U.S. Department of Energy
and the
National Science Foundation

U.S. LHC Joint Oversight Group

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Subject: Charge for the February 2006 Review of the U.S. LHC Software and Computing programs

The Joint Oversight Group (JOG) for the U.S. Large Hadron Collider (LHC) Program, supported by the Department of Energy and the National Science Foundation (DOE/NSF), greatly appreciates your willingness to participate in the review of the Software and Computing (S&C) progress and plans for the U.S. LHC Program. The review will take place at the University of California at San Diego on February 7-9, 2006.

The purpose is to evaluate the progress and plans of U.S. ATLAS and U.S. CMS S&C activities in order to assess the effectiveness of the management structures, and to learn whether the S&C activities are sufficiently strong and focused to facilitate the research of U.S. collaborators at the LHC. The review will concentrate on the scope, cost, and schedule of the S&C plans for the period leading up to the turn-on of the LHC, and scrutinize the needs of U.S. ATLAS and U.S. CMS for the initial period of LHC running. To this end, the collaborations will provide plans, including schedules, budgets, risk analysis and contingency plans for the development, deployment, and operation of the U.S. LHC software and computing infrastructure. The information should cover the period FY 2006 through FY 2010, with special emphasis on FY 2007 and 2008, and should be developed for the following two funding scenarios:

- Guidance Level (formerly referred to as “Barebones”) as described in the advance material sent to you, with internal allocations for S&C determined by the U.S. collaborations;
- Reduced Level, reduced by 10% from the Guidance Level. For this scenario, the collaborations should present the priorities of the U.S. S&C effort and the impact of reduced funding on both domestic and international schedules and deliverables.

The reviewers should also assess the progress made in implementing recommendations of previous reviews (March 2005 and August 2005). As a guide, we point to the following issues:

Management, External Interactions, and Physics

- Is the overall scope of the U.S. S&C effort well-matched to the needs of the community in exploiting LHC science opportunities?
- Are the estimated costs valid and well-justified in the various cost categories?
- Do the U.S. projects have strong connections to and communications with the international S&C efforts, the Worldwide LHC Computing Grid (WLCG) and the Open Science Grid (OSG)?
- Is risk evaluated and managed adequately? How might the risk of shortfalls in international S&C efforts or projects external to LHC Computing affect U.S. milestones? Are there areas missed in the evaluation of risk?
- Is there adequate contingency to react and adapt to budget and schedule uncertainties? Are the risk-management mechanisms appropriate?
- Is there sufficient communication between U.S.-ATLAS and U.S.-CMS? Are there further areas where common projects could be used to leverage overall resources?
- Assess the effectiveness of the physics-analysis models and whether they take into account the U.S. community's needs within the context of the international collaborations.
- Does management have adequate S&C plans to accommodate new collaborators? Have they developed a reasonable model for the corresponding incremental costs?

<u>Facilities, Grids, and Infrastructure</u>

- Assess the function and scope of the national U.S. LHC computing facilities (Tier-1 centers), their relationship to CERN (Tier-0 center) and to the regional facilities (Tier-2 centers), and whether present plans (hardware, grid software, and networking) are adequate for satisfying the needs as outlined in the experiments' documentation of computing models.
- Do the results of the latest round of data and service challenges lend support to the computing models proposed by U.S. scientists? Are U.S. scientists providing sufficient feedback on problems specific to U.S. involvement?
- Have infrastructure and operating costs of the Tier-1 and Tier-2 facilities been fully considered in their plans? Are there any assumptions that would be regarded as bearing high-risk? Are the estimated costs valid and well-justified?

<u>Core Software</u>

- Is the U.S. carrying its fair burden of the effort in core software, including leadership responsibilities?
- Are the U.S. collaborations sufficiently vigilant in controlling "scope creep"? Is there a well-defined strategy for defining the scope of U.S. participation and for the transition from development to production software?
- Is the U.S. core software portfolio balanced so as to give U.S. researchers a realistic chance for effective participation in the science of the LHC?
- How does the progress in core software measure up to the milestones shown at the previous comprehensive DOE/NSF review of the U.S. program in March 2005? Are U.S. milestones on track and realistic? Is there any critical dependence on international milestones that brings substantial risk to U.S. deliverables?

The review will be chaired by the U.S. LHC Research Associate Program Manager, Saul Gonzalez, with additional program staff from the DOE and the NSF in attendance. You will receive all available documentation at least one week prior to the start of the review. We will appreciate close-out statements following the reviews of both ATLAS and CMS, and more formal written reports within four weeks of the completion of your evaluation. This will provide valuable and timely input to the agencies and to the experiments. Your reports will also be made available to other DOE and NSF committees that review U.S. ATLAS and U.S. CMS projects.

Again, we wish to express our great appreciation for your willingness to participate in this important activity.

Sincerely,

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